

REMARKS

Claims 1, 2, 7-11, 16-22, 27-30, and 33-36 are currently pending in the subject application and are presently under consideration. Claims 1, 7, 10, 16, 19, 16, 27, 30, and 33-35 have been amended as shown on pp. 2-8 of the Reply. In addition, claims 5-6, 14-15, and 25-26 have been cancelled.

Applicant notes with appreciation the indication that claims 5-7, 14-16, and 25-27 recite allowable subject matter. Features of these claims have been incorporated into respective base claims so as to expedite favorable prosecution of this application, and place all claims in condition for allowance.

Favorable reconsideration of the subject patent application is respectfully requested in view of the comments and amendments herein.

I. Rejection of Claims 1-2, 8-11, 17-22, 28-30, and 33-36 Under 35 U.S.C. §103(a)

Claims 1-2, 8-11, 17-22, 28-30, and 33-36 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Luick (US 2003/0229662) in view of Conn Jr. (US 5,795,8). Withdrawal of this rejection is respectfully requested for at least the reasons. Luick and Conn Jr. alone or in combination, do not teach each and every element of the subject claims.

The claimed invention relates to a system, method, and means for determining an operating parameter of a chip, having first and second ring oscillators. This includes measuring a frequency of the first ring oscillator, measuring a frequency of the second ring oscillator, and calculating an operating parameter of the chip as a function of the first and second ring oscillator frequencies.

Specifically, claim 1 recites a method that comprises multiplying the measured frequency of the first ring oscillator by the measured frequency of the second ring oscillator to obtain a result; and determining, as a function of the result and characterization data of the chip, the chip's actual temperature. Further, independent claims 10, 19, and 39 recite one or more similar features as claim 1 in various forms, including at least a method, system or means that multiplies the measured frequency of the first ring oscillator by the measured frequency of the second ring oscillator to obtain a result; and determines, as a function of the result and characterization data of the chip, the chip's actual temperature.

As conceded in the office action, Luick does not teach or suggest the abovementioned novel features of applicant's claimed invention as recited in the subject claims. The cited reference relates to a temperature difference comparator (TDC) in which a first counter can be periodically initialized and increment at each cycle of ring oscillator 1. Also, a second counter in the TDC can be periodically initialized at the same times that the first counter is initialized, and increment at each cycle of ring oscillator 2. After a predetermined time following an initialization, the values of the first counter and the second counter can be compared, with the comparison determining whether ring oscillator 1 or 2 is of higher frequency, and the size of the frequency difference. The actual differences in frequencies provide the operating system with the severity of the hot spot. However, Luick does not teach a system that multiplies the measured frequency of the first ring oscillator by the measured frequency of the second ring oscillator to obtain a result; and determines, as a function of the result and characterization data of the chip, the chip's actual temperature.

Conn, Jr. was cited to make up for the deficiencies in Luick. Nevertheless, Conn, Jr. merely discloses a method for measuring localized operating temperatures on an integrated circuit. The integrated circuit includes an oscillator circuit with a frequency that varies temperature. The frequency of the oscillator is then determined using a constant voltage for a number of temperatures to establish a known relationship between oscillation frequency and temperature. Once the relationship is known, a similar oscillator is included within or adjacent a second circuit of the integrated circuit. The operating temperature may then be determined by monitoring the frequency of the oscillator while the second circuit is operational. However, as conceded in the Office Action, Conn, Jr. does not teach a system that multiplies the measured frequency of the first ring oscillator by the measured frequency of the second ring oscillator to obtain a result; and determines, as a function of the result and characterization data of the chip, the chip's temperature.

Hence, it is clear that neither Luick nor Conn, Jr. alone or in combination, suggest or teach each and every feature of independent claims 1, 10, 19, and 30 and the claims that depend there from. Thus, it is respectfully requested that this rejection be withdrawn.

II. Rejection of Claims 1, 10, 19, and 30 Under 35 U.S.C. §102(b)

Claims 1, 10, 19, and 30 stand rejected under 35 U.S.C. §102(b) as being anticipated by Conn Jr. (US 5,795,068). Withdrawal of this rejection is respectfully requested for at least the reasons. Luick does not teach each and every element of applicant's invention as recited in the subject claims.

The claimed invention relates to a system, method, and means for determining an operating parameter of a chip, having first and second ring oscillators. This includes measuring a frequency of the first ring oscillator, measuring a frequency of the second ring oscillator, and calculating an operating parameter of the chip as a function of the first and second ring oscillator frequencies.

Particularly, claim 1 recites a method that comprises multiplying the measured frequency of the first ring oscillator by the measured frequency of the second ring oscillator to obtain a result; and determining, as a function of the result and characterization data of the chip, the chip's actual temperature. Further, independent claims 10, 19, and 39 recite one or more similar features as claim 1 in various forms, including at least a method, system or means that multiplies the measured frequency of the first ring oscillator by the measured frequency of the second ring oscillator to obtain a result; and determines, as a function of the result and characterization data of the chip, the chip's actual temperature.

Luick does not teach or suggest the abovementioned novel features of applicant's claimed invention as recited in the subject claims. The cited reference relates to a temperature difference comparator (TDC) in which a first counter can be periodically initialized and increment at each cycle of ring oscillator 1. Also, a second counter in the TDC can be periodically initialized at the same times that the first counter is initialized, and increment at each cycle of ring oscillator 2. After a predetermined time following an initialization, the values of the first counter and the second counter can be compared, with the comparison determining whether ring oscillator 1 or 2 is of higher frequency, and the size of the frequency difference. The actual differences in frequencies provide the operating system with the severity of the hot spot. However, Luick is silent as to a system that multiplies the measured frequency of the first ring oscillator by the measured frequency of the second ring oscillator to obtain a result; and determines, as a function of the result and characterization data of the chip, the chip's actual temperature.

As a result, Luick fails to teach or suggest each and every feature of independent claims 1, 10, 19, and 30 and the claims that depend there from. Accordingly, withdrawal of this rejection is respectfully requested.

III. Allowable Subject Matter

Claims 5-7, 14-16, and 25-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 5, 14, and 25 have been cancelled and features thereof have been incorporated into independent claims 1, 10, and 19. Claims 6, 15, and 26 have been cancelled and features thereof added to independent claims 33, 34, and 35. Claims 7, 16, and 27 depend from claims 33, 34, and 35.

CONCLUSION

In view of the foregoing, Applicant submits that all pending claims in the application are patentable. Accordingly, reconsideration and allowance of the present application are respectfully requested. Should any issues remain unresolved, the Examiner is encouraged to telephone the undersigned at the number provided below.

If it is determined that fees are due, the Commissioner is hereby authorized to charge payment of any fee(s) or any underpayment of fee(s) or credit any overpayment(s) to Deposit Account No. 17-0026. If necessary, applicant requests, under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application and to charge the fees for a large entity under 37 CFR 1.17(a).

Respectfully submitted,

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